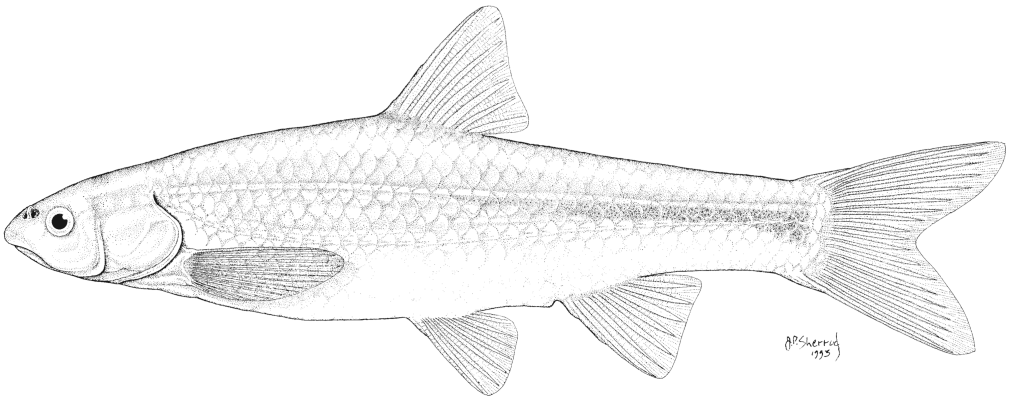
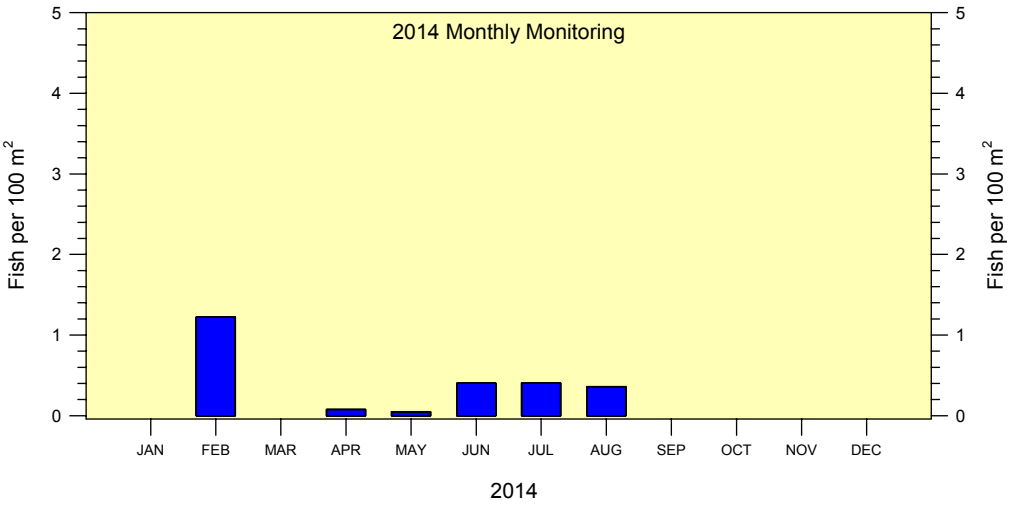
Summary of the Rio Grande Silvery Minnow Population Monitoring Program Results from August 2014

A Middle Rio Grande Endangered Species Collaborative Program Funded Research Project





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19 September 2014

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prepared for:

Middle Rio Grande Endangered Species Collaborative Program

under Contract GS-10F-0249X:

Order R14PD00314
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Summary of Overall August 2014 Population Monitoring Efforts

The August population monitoring efforts were conducted at 20 sites throughout the Middle Rio Grande. Five sites were located in the Angostura Reach, six sites in the Isleta Reach, and nine sites in the San Acacia Reach. A list of collection localities is appended (Table A-1).

Adult and juvenile fish were obtained by rapidly drawing a 3.1 m x 1.8 m small mesh (3/16th inch) seine through discrete mesohabitats. From May through October, larval fish are also collected with a 1.0 m x 1.0 m fine mesh (1/16th inch) seine. Rio Grande Silvery Minnow were counted and identified to age-class. Other fishes were identified to species and enumerated, but age-class was not determined. Figures illustrating fish densities (i.e., fish per 100 m^2) were prepared for the ten focal species, including Rio Grande Silvery Minnow, to facilitate comparisons among reaches.

During August, sampling covered 10,833.3 m^2 (surface area) of water and yielded 6,178 fish. Cumulative fish density during August was 57.0 individuals/100 m^2 sampled. The three most common species were Red Shiner (n = 3,294), Channel Catfish (n = 1,669), and Flathead Chub (n = 371). The 20 sampling sites yielded a total of 14 fish species. Rio Grande Silvery Minnow was present in 26 of the 301 seine hauls that yielded fish during August, as compared with 23 of the 295 seine hauls that yielded fish during July. The density of Rio Grande Silvery Minnow was 0.36 individuals/100 m^2 sampled (n = 39 {3% marked}) and this species composed 0.6% of the total number of fish collected during August.

Summary of August 2014 Population Monitoring Effort by River Reach

Angostura Reach

Mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gauge 8330000) averaged 694.5 and ranged from 362 to 2,490 cfs from 16 July to 15 August. Water temperatures were modest and stable (range = 21.3–24.6 ^{o}C) during the Angostura Reach sampling efforts (ca. 0830–1430 h). The water clarity was low throughout the reach; Secchi disk measurements ranged from 2 to 6 cm.

Sampling for fishes in the Angostura Reach during August yielded 1,052 individuals with a cumulative fish density of 36.7 individuals/100 m^2 sampled. The overall sampling effort in the Angostura Reach covered 2,866.8 m^2 (surface area) of water. Densities in the Angostura Reach, for all fish species combined, ranged from 22.1 to 71.2 individuals per 100 m^2 at the five sampling sites. In August, species richness (n = 12) was modest in the Angostura Reach. Channel Catfish was the most abundant taxon (n = 536), followed by Longnose Dace (n = 232), and Flathead Chub (n = 121). Rio Grande Silvery Minnow was present in 2 of the 81 seine hauls that yielded fish during August. Densities of Rio Grande Silvery Minnow ranged from 0.0 to 0.4 individuals per 100 m^2 at the five sampling sites.

Isleta Reach

In the Isleta Reach, mean daily discharge (Rio Grande at Isleta Lakes near Isleta, NM; USGS Gauge 08354900) averaged 691.5 and ranged from 283 to 2,490 cfs from 16 July to 15 August. Water temperatures ranged from 21.9 to 26.5 ^{o}C throughout the sampling localities during the day (ca. 0930–1600 h). The water was turbid throughout portions of the reach; Secchi disk readings ranged from 0 to 1 cm during sampling.

Isleta Reach population monitoring efforts produced 3,313 individuals in August with a cumulative fish density of 102.2 individuals/100 m^2 sampled. The total sampling effort in the Isleta Reach during

August covered 3,241.0 m^2 (surface area) of water. Fish densities (all species combined) at the six sites ranged from 14.1 to 161.0 individuals per 100 m^2 sampled. In August, species richness (n = 10) was modest in the Isleta Reach. Red Shiner was the most abundant taxon (n = 2,014), followed by Channel Catfish (n = 743), and Western Mosquitofish (n = 234). Rio Grande Silvery Minnow was present in 12 of the 96 seine hauls that yielded fish during August. Densities of Rio Grande Silvery Minnow ranged from 0.0 to 1.4 individuals per 100 m^2 at the six sampling sites.

San Acacia Reach

Mean daily discharge at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gauge 08354900) from 16 July to 15 August was generally higher (average = 604.1; range = 76 to 2,460 cfs) as compared to San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gauge 08358400) during the same period (average = 403.9; range = 22 to 1,780 cfs). Water temperatures in August for the San Acacia Reach ranged from 23.0 to 26.1 ^oC (ca. 0930–1500 h). Water clarity was extremely low throughout the reach (Secchi disk range = 0 to 0 cm).

Population monitoring efforts in the San Acacia Reach during August yielded 1,813 individuals with a cumulative fish density of 38.4 individuals/100 m^2 sampled. Sampling in the San Acacia Reach covered an area of 4,725.5 m^2 of water during August. Fish densities (all species combined) ranged from 4.2 to 88.6 individuals per 100 m^2 at the nine sites sampled in the San Acacia Reach. In August, species richness (n = 10) was modest in the San Acacia Reach. Red Shiner was the most abundant taxon (n = 1,204), followed by Channel Catfish (n = 390), and Flathead Chub (n = 163). Rio Grande Silvery Minnow was present in 12 of the 124 seine hauls that yielded fish during August. Densities of Rio Grande Silvery Minnow ranged from 0.0 to 2.6 individuals per 100 m^2 at the nine sampling sites.

CONCLUSIONS

The addition of large numbers of hatchery-reared Rio Grande Silvery Minnow in the autumn of 2013 (ca. 290,000; Thomas P. Archdeacon, New Mexico Fish and Wildlife Conservation Office, pers. comm.) resulted in relatively high densities of this species in December 2013. With the addition of large numbers of hatchery-reared Rio Grande Silvery Minnow, there should have presumably been adequate numbers of individuals available in the river for spawning in 2014. However, the total overwinter mortality for the current population of Rio Grande Silvery Minnow, which was composed almost entirely of hatchery-reared individuals, appears to have resulted in substantial losses of individuals by April/May 2014. Despite the relatively low abundance of Rio Grande Silvery Minnow during spring, managed flow increases over an extended duration during May (to coincide with typical spring runoff timing) appear to have resulted in an improvement in spawning and early recruitment of Rio Grande Silvery Minnow in 2014 as compared to other recent years (e.g., 2012–2013). During the August sampling effort, Rio Grande Silvery Minnow was present at 11 of the 20 sampling sites and there were 38 age-0 individuals (out of 39 total) collected. A preliminary assessment of the conservation status of Rio Grande Silvery Minnow in 2014 (based on its current occurrence and abundance) indicates notable improvement as compared to seasonal trends observed in 2013.

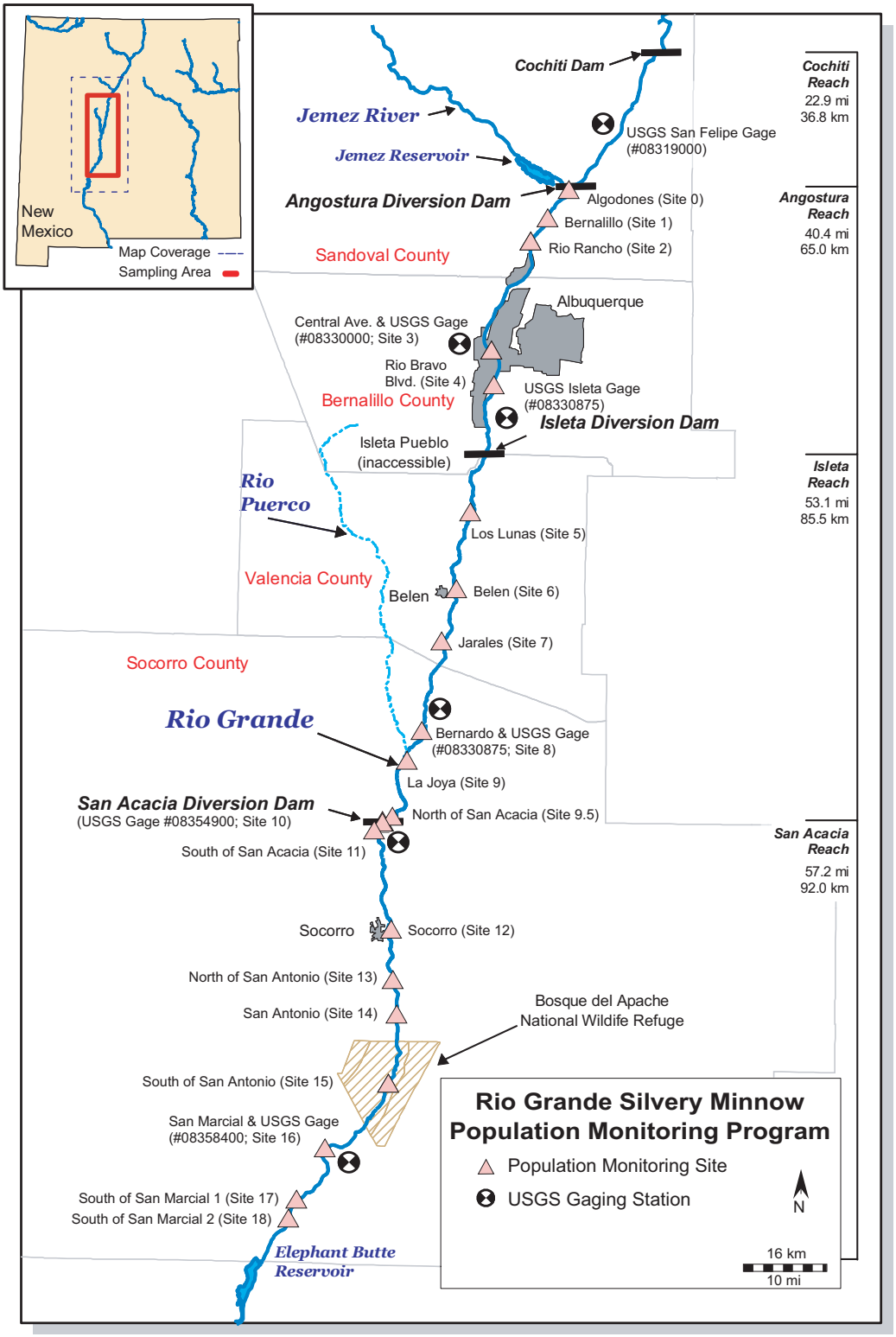

Figure 1. Map of the study area and sampling localities (numbered) for the Rio Grande Silvery Minnow population monitoring program. Sampling locality information that corresponds with the numbered localities is provided in Appendix A (Table A-1).

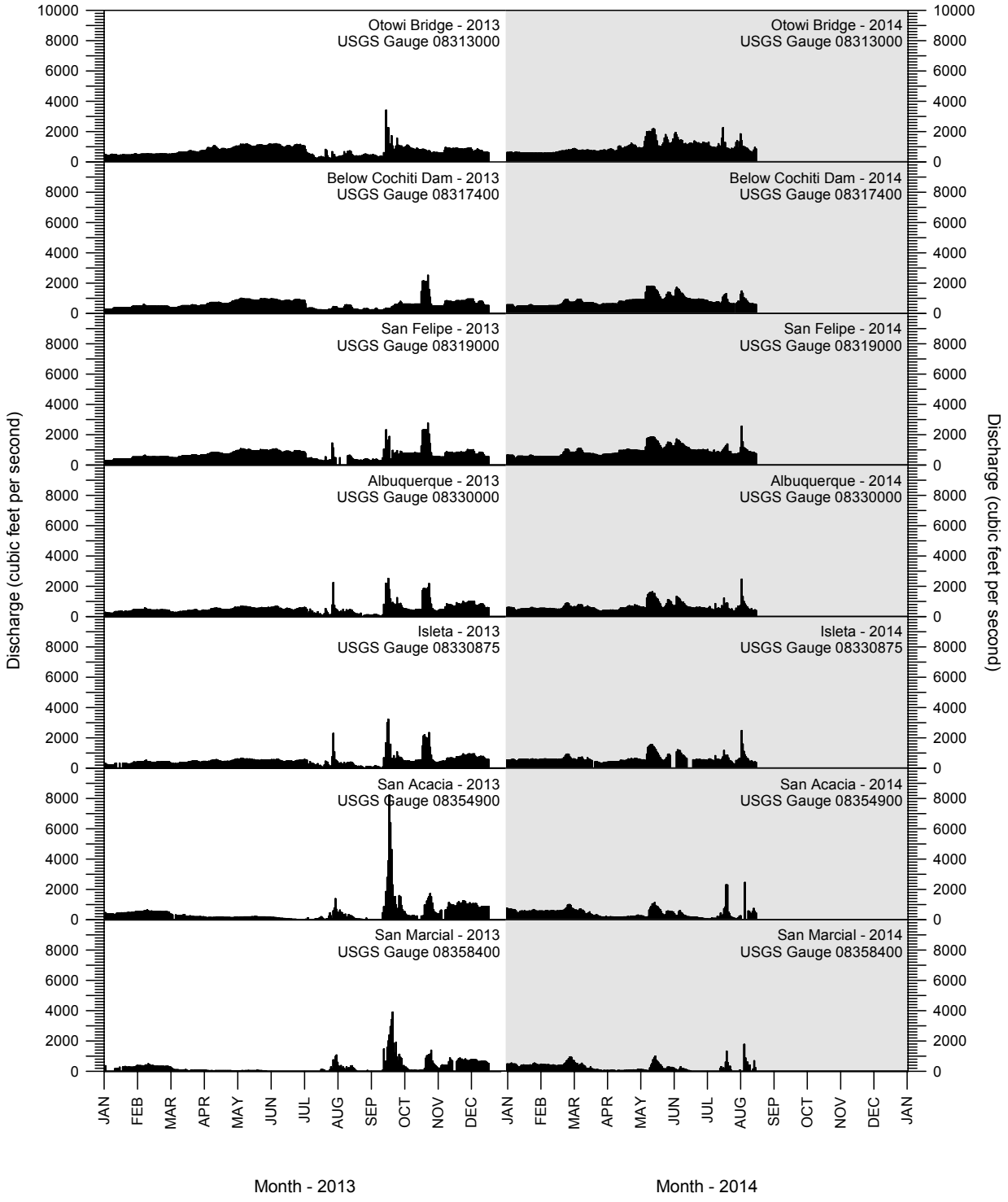

Figure 2. Discharge in the Rio Grande from 1 January 2013 through 15 August 2014 as recorded at seven U. S. Geological Survey (USGS) gauge stations. The Otowi Bridge gauge site is outside of the study area (ca. 25.5 river miles upstream of Cochiti Dam) and provided for reference. **Discharge data are provisional and subject to change.

Table 1. Scientific and common names and species codes of fish collected in the Middle Rio Grande during the Rio Grande Silvery Minnow population monitoring program (since 1993).

Scientific Name	Common Name	Code
Order Clupeiformes		
Family Clupeidae	herrings	
Dorosoma cepedianum	Gizzard Shad	(DORCEP)
Dorosoma petenense	Threadfin Shad	(DORPET)
Order Cypriniformes		
Family Cyprinidae	carps and minnows	
Campostoma anomalum	Central Stoneroller	(CAMANO)
Carassius auratus	Goldfish	(CARAUR)
Cyprinella lutrensis	Red Shiner[1]	(CYPLUT)
Cyprinus carpio	Common Carp[1]	(CYPCAR)
Gila pandora	Rio Grande Chub	(GILPAN)
Hybognathus amarus	Rio Grande Silvery Minnow[1]	(HYBAMA)
Notemigonus crysoleucas	Golden Shiner	(NOTCRY)
Pimephales promelas	Fathead Minnow[1]	(PIMPRO)
Pimephales vigilax	Bullhead Minnow	(PIMVIG)
Platygobio gracilis	Flathead Chub[1]	(PLAGRA)
Rhinichthys cataractae	Longnose Dace[1]	(RHICAT)
Family Catostomidae	suckers	
Carpiodes carpio	River Carpsucker[1]	(CARCAR)
Catostomus commersonii	White Sucker[1]	(CATCOM)
Ictiobus bubalus	Smallmouth Buffalo	(ICTBUB)
Order Siluriformes		
Family Ictaluridae	North American catfishes	
Ameiurus melas	Black Bullhead	(AMEMEL)
Ameiurus natalis	Yellow Bullhead	(AMENAT)
Ictalurus furcatus	Blue Catfish	(ICTFUR)
Ictalurus punctatus	Channel Catfish[1]	(ICTPUN)
Pylodictis olivaris	Flathead Catfish	(PYLOLI)
Order Salmoniformes		
Family Salmonidae	trouts and salmons	
Oncorhynchus mykiss	Rainbow Trout	(ONCMYK)
Salmo trutta	Brown Trout	(SALTRU)

Table 1. (continued) Scientific and common names and species codes of fish collected in the Middle Rio Grande during the Rio Grande Silvery Minnow population monitoring program (since 1993).

Scientific Name	Common Name	Code
Order Cyprinodontiformes		
Family Poeciliidae	livebearers	
Gambusia affinis	Western Mosquitofish[1]	(GAMAFF)
Order Perciformes		
Family Moronidae	temperate basses	
Morone chrysops	White Bass	(MORCHR)
Morone saxatilis	Striped Bass	(MORSAX)
Family Centrarchidae	sunfishes	
Lepomis cyanellus	Green Sunfish	(LEPCYA)
Lepomis macrochirus	Bluegill	(LEPMAC)
Lepomis megalotis	Longear Sunfish	(LEPMEG)
Micropterus dolomieu	Smallmouth Bass	(MICDOL)
Micropterus salmoides	Largemouth Bass	(MICSAL)
Pomoxis annularis	White Crappie	(POMANN)
Pomoxis nigromaculatus	Black Crappie	(POMNIG)
Family Percidae	perches	
Perca flavescens	Yellow Perch	(PERFLA)
Percina macrolepida	Bigscale Logperch	(PERMAC)
Sander vitreus	Walleye	(SANVIT)

[1] Focal taxa represent the most abundant species present in recent Middle Rio Grande collections; these species are illustrated in monthly plots of data.

Table 2. Summary of the August 2014 Rio Grande Silvery Minnow population monitoring program results (species list is based on fish collected since 1993).

FAMILY	SPECIES COMMON NAME	RESIDENCE STATUS[1]	TOTAL NUMBER OF SPECIMENS	PERCENT (%) OF TOTAL	FREQUENCY OF OCCURRENCE[2]	% FREQUENCY OCCURRENCE[2]
Clupeidae	Gizzard Shad	N	-	-	-	-
Clupeidae	Threadfin Shad	I	-	-	-	-
Cyprinidae	Central Stoneroller	I	-	-	-	-
Cyprinidae	Goldfish	I	-	-	-	-
Cyprinidae	Red Shiner	N	3,294	53.32	19	95
Cyprinidae	Common Carp	I	16	0.26	11	55
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	39	0.63	11	55
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	164	2.65	13	65
Cyprinidae	Bullhead Minnow	I	2	0.03	2	10
Cyprinidae	Flathead Chub	N	371	6.01	18	90
Cyprinidae	Longnose Dace	N	233	3.77	5	25
Catostomidae	River Carpsucker	N	68	1.10	9	45
Catostomidae	White Sucker	I	24	0.39	4	20
Catostomidae	Smallmouth Buffalo	N	-	-	-	-
Ictaluridae	Black Bullhead	I	1	0.02	1	5
Ictaluridae	Yellow Bullhead	I	17	0.28	5	25
Ictaluridae	Blue Catfish	N	-	-	-	-
Ictaluridae	Channel Catfish	I	1,669	27.02	20	100
Ictaluridae	Flathead Catfish	N	1	0.02	1	5
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	279	4.52	17	85
Moronidae	White Bass	I	-	-	-	-
Moronidae	Striped Bass	I	-	-	-	-
Centrarchidae	Green Sunfish	I	-	-	-	-
Centrarchidae	Bluegill	N	-	-	-	-
Centrarchidae	Longear Sunfish	I	-	-	-	-
Centrarchidae	Smallmouth Bass	I	-	-	-	-
Centrarchidae	Largemouth Bass	I	-	-	-	-
Centrarchidae	White Crappie	I	-	-	-	-
Centrarchidae	Black Crappie	I	-	-	-	-
Percidae	Yellow Perch	I	-	-	-	-
Percidae	Bigscale Logperch	I	-	-	-	-
Percidae	Walleye	I	-	-	-	-

[1] N = native; I = introduced
[2] Frequency and % frequency of occurrence are based on 20 sample sites.

Table 3. Summary of the monthly catch of all fish species during 2014 (species list is based on fish collected since 1993).

FAMILY	SPECIES COMMON NAME	FEB	APR	MAY	JUN	JUL	AUG	SEP	OCT	DEC	TOTAL
Clupeidae	Gizzard Shad	-	2	1	4	14	-	-	-	-	21
Clupeidae	Threadfin Shad	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Central Stoneroller	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Goldfish	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Red Shiner	2,603	4,650	3,453	3,277	6,493	3,294	-	-	-	23,770
Cyprinidae	Common Carp	3	1	9	51	133	16	-	-	-	213
Cyprinidae	Rio Grande Chub	-	-	-	-	1	-	-	-	-	1
Cyprinidae	Rio Grande Silvery Minnow	142	8	5	43	37	39	-	-	-	274
Cyprinidae	Golden Shiner	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Fathead Minnow	108	21	49	196	179	164	-	-	-	717
Cyprinidae	Bullhead Minnow	5	2	2	5	-	2	-	-	-	16
Cyprinidae	Flathead Chub	41	17	100	175	639	371	-	-	-	1,343
Cyprinidae	Longnose Dace	-	2	61	96	240	233	-	-	-	632
Catostomidae	River Carpsucker	9	5	4	124	497	68	-	-	-	707
Catostomidae	White Sucker	1	2	32	268	130	24	-	-	-	457
Catostomidae	Smallmouth Buffalo	-	-	-	-	48	-	-	-	-	48
Ictaluridae	Black Bullhead	-	-	-	-	-	1	-	-	-	1
Ictaluridae	Yellow Bullhead	-	-	1	2	2	17	-	-	-	22
Ictaluridae	Blue Catfish	-	-	-	10	1	-	-	-	-	11
Ictaluridae	Channel Catfish	7	5	59	49	846	1,669	-	-	-	2,635
Ictaluridae	Flathead Catfish	-	-	-	-	-	1	-	-	-	1
Salmonidae	Rainbow Trout	-	-	-	-	-	-	-	-	-	0
Salmonidae	Brown Trout	-	-	-	-	-	-	-	-	-	0
Poeciliidae	Western Mosquitofish	24	54	38	101	457	279	-	-	-	953
Moronidae	White Bass	5	-	-	-	-	-	-	-	-	5
Moronidae	Striped Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Green Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Bluegill	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Longear Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Smallmouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Largemouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	White Crappie	1	2	-	8	2	-	-	-	-	13
Centrarchidae	Black Crappie	-	-	-	-	-	-	-	-	-	0
Percidae	Yellow Perch	-	-	-	-	-	-	-	-	-	0
Percidae	Bigscale Logperch	1	-	-	-	-	-	-	-	-	1
Percidae	Walleye	-	-	-	2	3	-	-	-	-	5
MONTHLY TOTALS		2,950	4,771	3,814	4,411	9,722	6,178	0	0	0	31,846

Table 4. Summary of the monthly catch of Rio Grande Silvery Minnow, by site and reach, during 2014. All marked individuals at a site are shown in parentheses (subset of the total).

REACH	SITE #	SITE NAME	FEB	APR	MAY	JUN	JUL	AUG	SEP	OCT	DEC	TOTAL
Angostura	0	Angostura Dam	-	-	-	-	-	-	-	-	-	0
Angostura	1	Bernalillo	-	-	-	-	3(0)	-	-	-	-	3
Angostura	2	Rio Rancho	-	-	-	-	5(0)	-	-	-	-	5
Angostura	3	Central Ave.	1(1)	-	-	-	3(2)	2(0)	-	-	-	6
Angostura	4	Rio Bravo Blvd.	3(3)	-	-	3(0)	-	-	-	-	-	6
Angostura Totals			4	0	0	3	11	2	0	0	0	20
Isleta	5	Los Lunas	2(2)	-	2(2)	2(0)	1(0)	7(0)	-	-	-	14
Isleta	6	Belen	9(9)	-	-	15(0)	1(0)	3(0)	-	-	-	28
Isleta	7	Jarales	1(1)	-	-	3(1)	2(0)	1(0)	-	-	-	7
Isleta	8	Bernardo	10(10)	1(1)	-	-	4(0)	2(0)	-	-	-	17
Isleta	9	La Joya	2(2)	-	-	3(0)	-	6(0)	-	-	-	11
Isleta	9.5	North of San Acacia	2(2)	-	-	3(0)	1(0)	-	-	-	-	6
Isleta Totals			26	1	2	26	9	19	0	0	0	83
San Acacia	10	San Acacia Dam	14(14)	4(2)	2(2)	4(3)	10(3)	-	-	-	-	34
San Acacia	11	South of San Acacia	29(28)	2(1)	1(1)	3(0)	3(2)	-	-	-	-	38
San Acacia	12	Socorro	27(26)	1(0)	-	2(0)	-	2(1)	-	-	-	32
San Acacia	13	North of San Antonio	8(8)	-	-	3(0)	-	-	-	-	-	11
San Acacia	14	San Antonio	9(8)	-	-	-	-	1(0)	-	-	-	10
San Acacia	15	South of San Antonio	-	-	-	2(2)	-	1(0)	-	-	-	3
San Acacia	16	San Marcial	1(1)	-	-	-	4(1)	-	-	-	-	5
San Acacia	17	South of San Marcial 1	15(14)	-	-	-	-	13(0)	-	-	-	28
San Acacia	18	South of San Marcial 2	9(8)	-	-	-	-	1(0)	-	-	-	10
San Acacia Totals			112	7	3	14	17	18	0	0	0	171
MONTHLY TOTALS			142	8	5	43	37	39	0	0	0	274

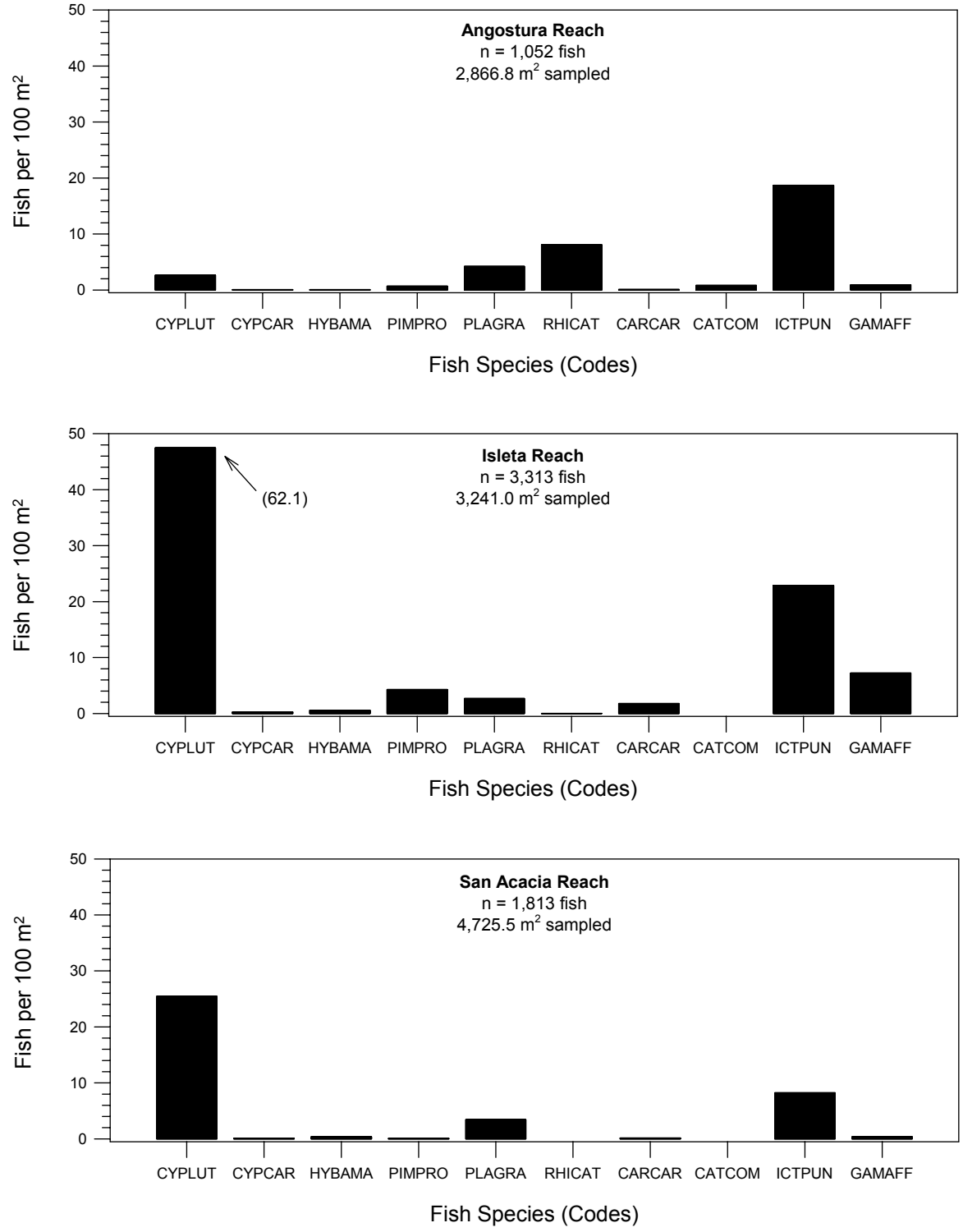

Figure 3. Fish densities from August 2014 for each focal species in the three reaches of the Middle Rio Grande (see Table 1 for fish species codes).

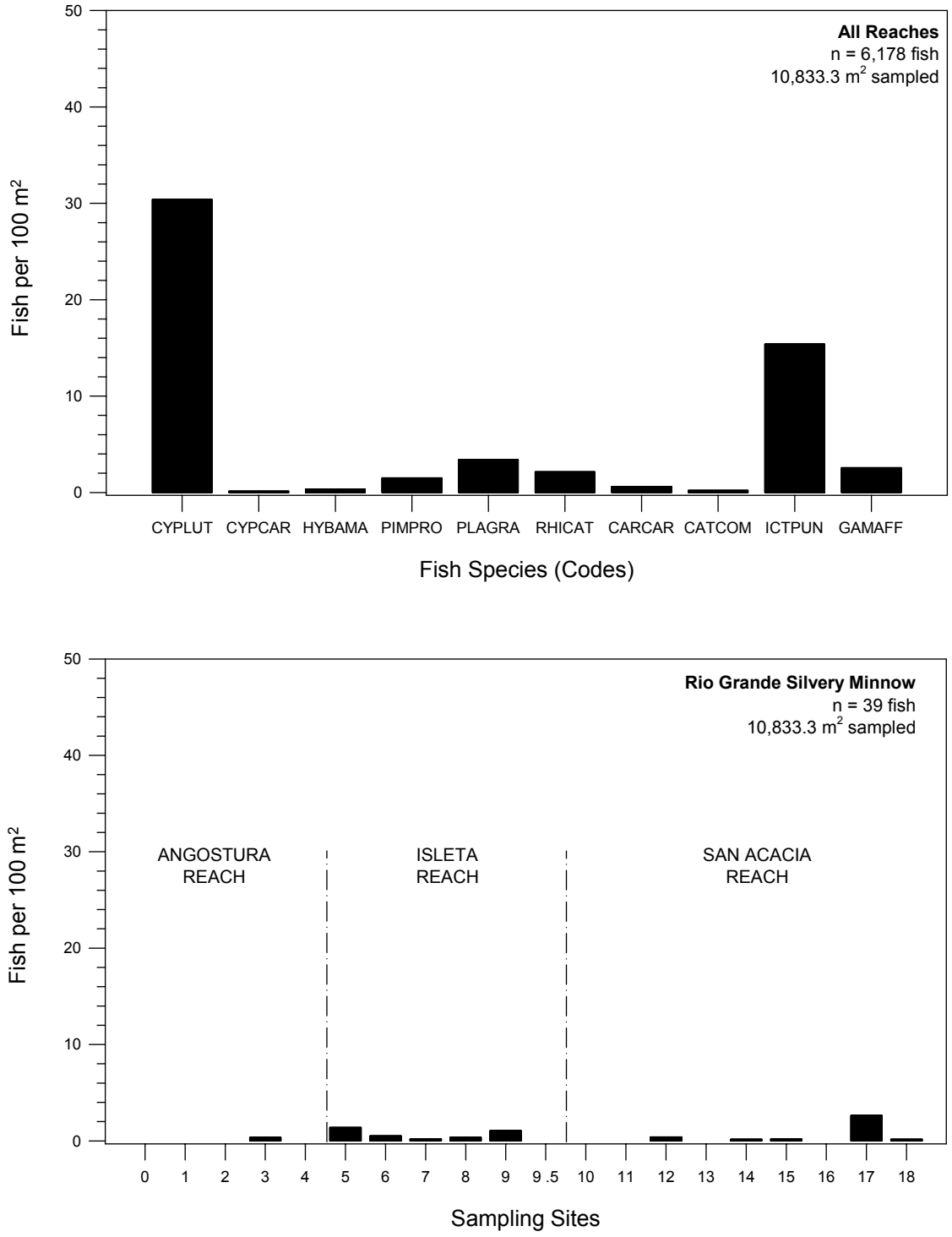

Figure 4. Catch rates for ten focal species from all reaches combined, including Rio Grande Silvery Minnow, during August 2014 at Rio Grande Silvery Minnow population monitoring program collection sites (see Table 1 for fish species codes).

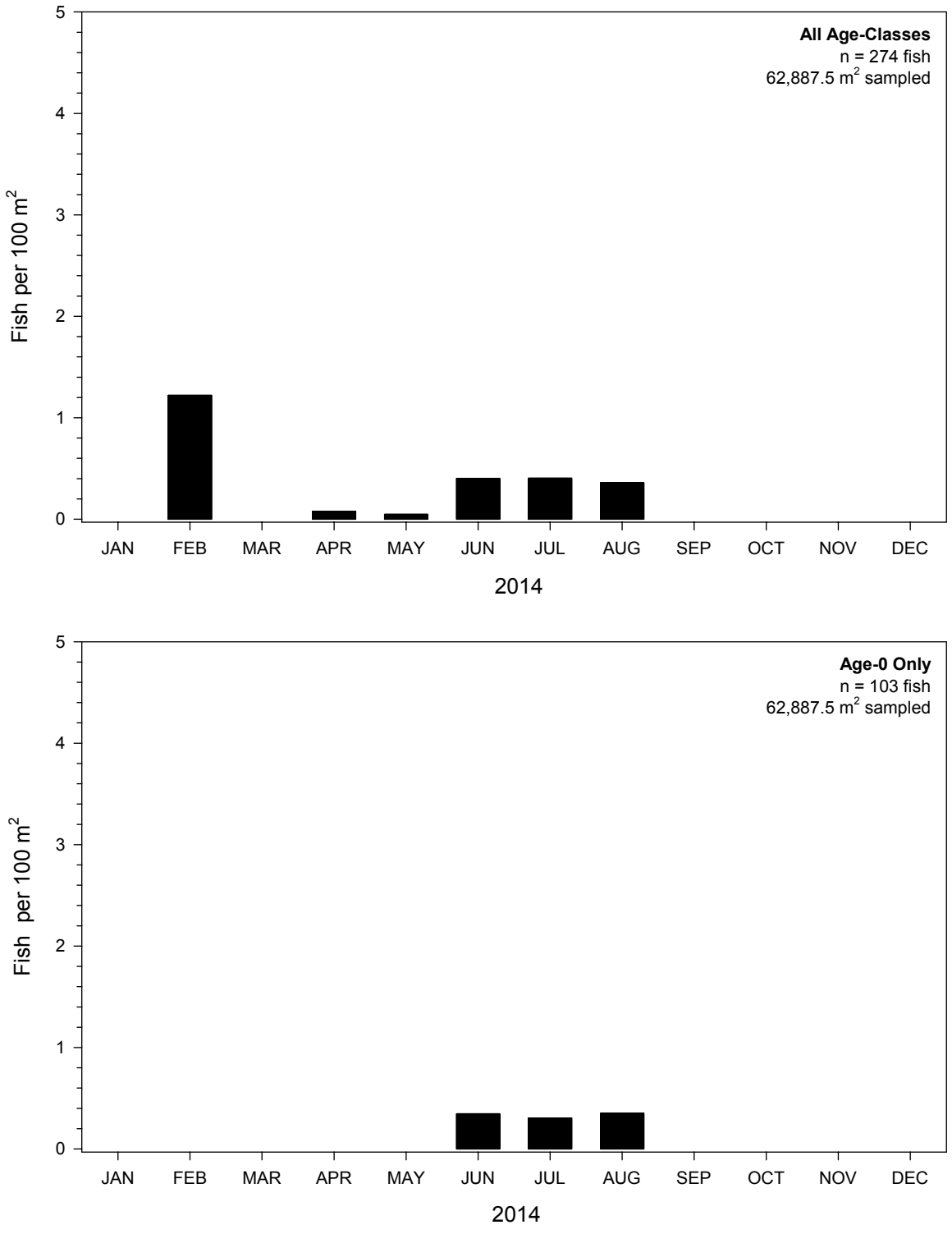

Figure 5. Inter-month fluctuations in densities of Rio Grande Silvery Minnow (all age-classes and age-0 only) during 2014.

APPENDIX A.

Collection localities of the Rio Grande Silvery Minnow population monitoring program.

Table A-1. Collection localities of the Rio Grande Silvery Minnow population monitoring program.

Site #	Site Locality

ANGOSTURA REACH SITES
SITE #

0 New Mexico, Sandoval County, Rio Grande, below Angostura Diversion Dam, Algodones.
River Mile 209.7 SAN FELIPE PUEBLO QUADRANGLE
3916006 N 363811 E

1 New Mexico, Sandoval County, Rio Grande, at US Highway 550 bridge crossing, (formerly NM State Highway 44 bridge crossing), Bernalillo.
River Mile 203.8 BERNALILLO QUADRANGLE
3909722 N 358543 E

2 New Mexico, Sandoval County, Rio Grande, ca. 4 miles downstream of US Highway 550 bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho.
River Mile 200.0 BERNALILLO QUADRANGLE
3905355 N 354772 E

3 New Mexico, Bernalillo County, Rio Grande, at Central Avenue (US Highway 66) bridge crossing, Albuquerque.
River Mile 183.4 ALBUQUERQUE WEST QUADRANGLE
3884094 N 346840 E

4 New Mexico, Bernalillo County, Rio Grande, at Rio Bravo Boulevard bridge crossing, Albuquerque.
River Mile 178.3 ALBUQUERQUE WEST QUADRANGLE
3877163 N 347554 E

ISLETA REACH SITES
SITE #

5 New Mexico, Valencia County, Rio Grande, at Los Lunas (NM State Highway 49) bridge crossing, Los Lunas.
River Mile 161.4 LOS LUNAS QUADRANGLE
3852531 N 342898 E

6 New Mexico, Valencia County, Rio Grande, ca. 1.0 miles upstream of NM State Highway 309/6 bridge crossing, Belen.
River Mile 151.5 TOME QUADRANGLE
3837061 N 339972 E

7 New Mexico, Valencia County, Rio Grande, ca. 2.2 miles upstream of NM State Highway 346 bridge crossing (near Transwestern Natural Gas Pipeline crossing), Jarales.
River Mile 143.2 VEGUITA QUADRANGLE
3827329 N 338136 E

Table A-1. Collection localities of the Rio Grande Silvery Minnow population monitoring program (continued).

Site #	Site Locality

ISLETA REACH SITES (continued)
SITE #

8 New Mexico, Socorro County, Rio Grande, at US Highway 60 bridge crossing, Bernardo.
River Mile 130.6 ABEYTAS QUADRANGLE
3809726 N 334604 E

9 New Mexico, Socorro County, Rio Grande, ca. 3.5 miles downstream of US Highway 60 bridge crossing, La Joya.
River Mile 127.0 ABEYTAS QUADRANGLE
3805229 N 331094 E

9.5 New Mexico, Socorro County, Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia.
River Mile 116.8 LA JOYA QUADRANGLE
3792603 N 327902 E

SAN ACACIA REACH SITES
SITE #

10 New Mexico, Socorro County, Rio Grande, directly below San Acacia Diversion Dam, San Acacia.
River Mile 116.2 SAN ACACIA QUADRANGLE
3791977 N 326162 E

11 New Mexico, Socorro County, Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia.
River Mile 114.6 LEMITAR QUADRANGLE
3790442 N 325263 E

12 New Mexico, Socorro County, Rio Grande, 0.5 miles upstream of the Low Flow Conveyance Channel bridge, east and upstream of Socorro Wastewater Treatment Plant, Socorro.
River Mile 99.5 LOMA DE LAS CANAS QUADRANGLE
3771043 N 327097 E

13 New Mexico, Socorro County, Rio Grande, ca. 4.0 miles upstream of US Highway 380 bridge crossing, San Antonio.
River Mile 91.7 SAN ANTONIO QUADRANGLE
3761283 N 328140 E

14 New Mexico, Socorro County, Rio Grande, at US Highway 380 bridge crossing, San Antonio.
River Mile 87.1 SAN ANTONIO QUADRANGLE
3754471 N 328914 E

Table A-1. Collection localities of the Rio Grande Silvery Minnow population monitoring program (continued).

Site #	Site Locality

SAN ACACIA REACH SITES (continued)
SITE #

15 New Mexico, Socorro County, Rio Grande, directly east of Bosque del Apache National Wildlife Refuge headquarters, San Antonio.
River Mile 79.1 SAN ANTONIO, SE QUADRANGLE
3740839 N 327055 E

16 New Mexico, Socorro County, Rio Grande, at the San Marcial railroad crossing, San Marcial.
River Mile 68.6 SAN MARCIAL QUADRANGLE
3728347 N 315284 E

17 New Mexico, Socorro County, Rio Grande, at its former confluence with the Low Flow Conveyance Channel and 16 miles downstream of the southern end of the Bosque del Apache National Wildlife Refuge, San Marcial.
River Mile 60.5 PARAJE WELL QUADRANGLE
3718178 N 309487 E

18 New Mexico, Socorro County, Rio Grande, ca. 10 miles downstream of the San Marcial Railroad Bridge crossing, San Marcial.
River Mile 58.8 PARAJE WELL QUADRANGLE
3716150 N 307846 E

APPENDIX B.

Ichthyofaunal composition of the August 2014
Rio Grande Silvery Minnow population monitoring efforts

** Data are provisional and should be verified by direct inspection of field data whenever possible **

Rio Grande Silvery Minnow Population Monitoring
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NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD14-118**
Rio Grande, directly below Angostura Diversion Dam, Algodones.

Site Number: 0 River Mile: 209.7 05 August 2014
UTM Easting: 363811 UTM Northing: 3916006 Zone: 13 Quad: San Felipe Pueblo
R.K. Dudley, A.L. Barkalow, M. Solis Effort: 529.8 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	13
76	*Cyprinus carpio*	1
76	*Platygobio gracilis*	7
76	*Rhinichthys cataractae*	195
81	*Catostomus commersonii*	10
93	*Ameiurus natalis*	3
93	*Ictalurus punctatus*	4
212	*Gambusia affinis*	1

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD14-119**
Rio Grande, at US HWY 550 (formerly NM State HWY 44) bridge crossing, Bernalillo.

Site Number: 1 River Mile: 203.8 05 August 2014
UTM Easting: 358543 UTM Northing: 3909722 Zone: 13 Quad: Bernalillo
R.K. Dudley, A.L. Barkalow, M. Solis Effort: 652.8 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	9
76	*Cyprinus carpio*	1
76	*Pimephales promelas*	4
76	*Platygobio gracilis*	46
76	*Rhinichthys cataractae*	28
81	*Catostomus commersonii*	2
93	*Ameiurus melas*	1
93	*Ictalurus punctatus*	43
212	*Gambusia affinis*	10

Rio Grande Silvery Minnow Population Monitoring
August 2014

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD14-120**
Rio Grande, ca. 4.0 miles downstream of US HWY 550 (formerly NM State HWY 44) bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho.

Site Number: 2 River Mile: 200.0 05 August 2014
UTM Easting: 354772 UTM Northing: 3905355 Zone: 13 Quad: Bernalillo
R.K. Dudley, A.L. Barkalow, M. Solis Effort: 564.1 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	21
76	*Pimephales promelas*	10
76	*Platygobio gracilis*	46
76	*Rhinichthys cataractae*	7
81	*Catostomus commersonii*	11
93	*Ictalurus punctatus*	46
212	*Gambusia affinis*	2

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage **RKD14-117**
Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque.

Site Number: 3 River Mile: 183.4 05 August 2014
UTM Easting: 346840 UTM Northing: 3884094 Zone: 13 Quad: Albuquerque West
R.K. Dudley, A.L. Barkalow, M. Solis Effort: 543.4 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	18
76	*Hybognathus amarus**	2
76	*Pimephales promelas*	4
76	*Platygobio gracilis*	17
76	*Rhinichthys cataractae*	2
81	*Carpiodes carpio*	1
81	*Catostomus commersonii*	1
93	*Ictalurus punctatus*	341
212	*Gambusia affinis*	1

***Hybognathus amarus* by age class:**
age-0: 2
age-1:
age-2:

Rio Grande Silvery Minnow Population Monitoring
August 2014

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage **RKD14-116**
Rio Grande, at Rio Bravo Blvd. Bridge crossing (NM State HWY 500) crossing, Albuquerque.

Site Number: 4 River Mile: 178.3 05 August 2014
UTM Easting: 347554 UTM Northing: 3877163 Zone: 13 Quad: Albuquerque West
R.K. Dudley, A.L. Barkalow, M. Solis Effort: 576.7 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	15
76	*Pimephales promelas*	2
76	*Platygobio gracilis*	5
81	*Carpiodes carpio*	2
93	*Ameiurus natalis*	5
93	*Ictalurus punctatus*	102
212	*Gambusia affinis*	13

NEW MEXICO: VALENCIA Co., RIO GRANDE Drainage **RKD14-115**
Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas.

Site Number: 5 River Mile: 161.4 08 August 2014
UTM Easting: 342898 UTM Northing: 3852531 Zone: 13 Quad: Los Lunas
M.A. Farrington, A.L. Barkalow, A.L. Fitzgerald Effort: 501.4 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	217
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	7
76	*Pimephales promelas*	29
76	*Platygobio gracilis*	5
81	*Carpiodes carpio*	22
93	*Ictalurus punctatus*	90
212	*Gambusia affinis*	24

***Hybognathus amarus* by age class:**
age-0: 7
age-1:
age-2:

Rio Grande Silvery Minnow Population Monitoring
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NEW MEXICO: VALENCIA Co., RIO GRANDE Drainage **RKD14-114**
Rio Grande, ca. 1.0 miles upstream of NM State HWY 309/6 bridge crossing, Belen.

Site Number: 6 River Mile: 151.5 08 August 2014
UTM Easting: 339972 UTM Northing: 3837061 Zone: 13 Quad: Tome
M.A. Farrington, A.L. Barkalow, A.L. Fitzgerald Effort: 561.4 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	552
76	*Cyprinus carpio*	3
76	*Hybognathus amarus**	3
76	*Pimephales promelas*	31
76	*Platygobio gracilis*	12
81	*Carpiodes carpio*	11
93	*Ictalurus punctatus*	240
212	*Gambusia affinis*	52

*** *Hybognathus amarus* by age class:**

age-0: 3
age-1:
age-2:

Rio Grande Silvery Minnow Population Monitoring
August 2014

NEW MEXICO: VALENCIA Co., RIO GRANDE Drainage **RKD14-113**
Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales.

Site Number: 7 River Mile: 143.2 08 August 2014
UTM Easting: 338136 UTM Northing: 3827329 Zone: 13 Quad: Veguita
M.A. Farrington, A.L. Barkalow, A.L. Fitzgerald Effort: 519.4 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	242
76	*Cyprinus carpio*	2
76	*Hybognathus amarus**	1
76	*Pimephales promelas*	45
81	*Carpiodes carpio*	7
93	*Ameiurus natalis*	2
93	*Ictalurus punctatus*	52
212	*Gambusia affinis*	64

*** *Hybognathus amarus* by age class:**

age-0: 1
age-1:
age-2:

Rio Grande Silvery Minnow Population Monitoring
August 2014

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-112**
Rio Grande, at US HWY 60 bridge crossing, Bernardo.

Site Number: 8 River Mile: 130.6 08 August 2014
UTM Easting: 334604 UTM Northing: 3809726 Zone: 13 Quad: Abeytas
M.A. Farrington, A.L. Barkalow, A.L. Fitzgerald Effort: 525.4 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	514
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	2
76	*Pimephales promelas*	19
76	*Platygobio gracilis*	8
81	*Carpiodes carpio*	9
93	*Ameiurus natalis*	3
93	*Ictalurus punctatus*	117
212	*Gambusia affinis*	42

*** *Hybognathus amarus* by age class:**

age-0: 2
age-1:
age-2:

Rio Grande Silvery Minnow Population Monitoring
August 2014

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-111**
Rio Grande, ca. 3.5 miles downstream of the US HWY 60 bridge crossing, Bernardo.

Site Number: 9 River Mile: 127.0 08 August 2014
UTM Easting: 331094 UTM Northing: 3805229 Zone: 13 Quad: Abeytas
M.A. Farrington, A.L. Barkalow, A.L. Fitzgerald Effort: 566.4 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	489
76	*Cyprinus carpio*	2
76	*Hybognathus amarus**	6
76	*Pimephales promelas*	15
76	*Platygobio gracilis*	14
81	*Carpiodes carpio*	9
93	*Ameiurus natalis*	4
93	*Ictalurus punctatus*	216
212	*Gambusia affinis*	49

***Hybognathus amarus* by age class:**
age-0: 6
age-1:
age-2:

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-110**
Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia

Site Number: 9.5 River Mile: 116.8 06 August 2014
UTM Easting: 327902 UTM Northing: 3792603 Zone: 13 Quad: La Joya
M.A. Farrington, T.A. Diver, A.L. Fitzgerald Effort: 567.0 sq. m

FAMILY		N
76	*Platygobio gracilis*	48
76	*Rhinichthys cataractae*	1
93	*Ictalurus punctatus*	28
212	*Gambusia affinis*	3

Rio Grande Silvery Minnow Population Monitoring
August 2014

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-109**
Rio Grande, directly below San Acacia Diversion Dam, San Acacia.

Site Number: 10 River Mile: 116.2 06 August 2014
UTM Easting: 326162 UTM Northing: 3791977 Zone: 13 Quad: San Acacia
M.A. Farrington, T.A. Diver, A.L. Fitzgerald Effort: 524.6 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	23
76	*Platygobio gracilis*	79
81	*Carpiodes carpio*	2
93	*Ictalurus punctatus*	147
212	*Gambusia affinis*	3

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-108**
Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia.

Site Number: 11 River Mile: 114.6 06 August 2014
UTM Easting: 325263 UTM Northing: 3790442 Zone: 13 Quad: Lemitar
M.A. Farrington, T.A. Diver, A.L. Fitzgerald Effort: 528.6 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	10
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	48
93	*Ictalurus punctatus*	11
212	*Gambusia affinis*	1

Rio Grande Silvery Minnow Population Monitoring
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NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-107**
Rio Grande, east of Socorro, 0.5 miles upstream of Socorro Low Flow Conveyance Channel bridge and east just upstream of Socorro Wastewater Treatment Plant, Socorro.

Site Number: 12 River Mile: 99.5 06 August 2014
UTM Easting: 327097 UTM Northing: 3771043 Zone: 13 Quad: Loma de las Canas
M.A. Farrington, T.A. Diver, A.L. Fitzgerald Effort: 479.0 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	29
76	*Hybognathus amarus**	2
76	*Platygobio gracilis*	14
93	*Ictalurus punctatus*	10

***Hybognathus amarus* by age class:**
age-0: 1
age-1: 1
age-2:

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-106**
Rio Grande, ca. 4.0 miles upstream of U.S. 380 bridge crossing.

Site Number: 13 River Mile: 91.7 06 August 2014
UTM Easting: 328140 UTM Northing: 3761283 Zone: 13 Quad: San Antonio
M.A. Farrington, T.A. Diver, A.L. Fitzgerald Effort: 553.3 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	75
76	*Cyprinus carpio*	1
76	*Platygobio gracilis*	1
93	*Ictalurus punctatus*	32
93	*Pylodictis olivaris*	1
212	*Gambusia affinis*	3

Rio Grande Silvery Minnow Population Monitoring
August 2014

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-105**
Rio Grande, at US HWY 380 bridge crossing, San Antonio.

Site Number: 14 River Mile: 87.1 04 August 2014
UTM Easting: 328914 UTM Northing: 3754471 Zone: 13 Quad: San Antonio
R.K. Dudley, A.L. Barkalow, and S.L. Clark-Barkalow Effort: 560.2 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	359
76	*Cyprinus carpio*	2
76	*Hybognathus amarus**	1
76	*Pimephales promelas*	2
76	*Pimephales vigilax*	1
76	*Platygobio gracilis*	5
81	*Carpiodes carpio*	5
93	*Ictalurus punctatus*	49
212	*Gambusia affinis*	6

***Hybognathus amarus* by age class:**

age-0: 1
age-1:
age-2:

Rio Grande Silvery Minnow Population Monitoring
August 2014

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-104**
Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters.

Site Number: 15 River Mile: 79.1 04 August 2014
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San Antonio SE
R.K. Dudley, A.L. Barkalow, and S.L. Clark-Barkalow Effort: 526.3 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	1
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	1
93	*Ictalurus punctatus*	15
212	*Gambusia affinis*	4

*** *Hybognathus amarus* by age class:**

age-0: 1
age-1:
age-2:

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-103**
Rio Grande, at San Marcial Railroad Bridge, San Marcial.

Site Number: 16 River Mile: 68.6 04 August 2014
UTM Easting: 315284 UTM Northing: 3728347 Zone: 13 Quad: San Marcial
R.K. Dudley, A.L. Barkalow, and S.L. Clark-Barkalow Effort: 500.5 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	91
76	*Platygobio gracilis*	10
93	*Ictalurus punctatus*	13

Rio Grande Silvery Minnow Population Monitoring
August 2014

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-102**
Rio Grande, ca. 8 miles downstream of the San Marcial railroad bridge crossing

Site Number: 17 River Mile: 60.5 04 August 2014
UTM Easting: 309487 UTM Northing: 3718178 Zone: 13 Quad: Paraje Well
R.K. Dudley, A.L. Barkalow, and S.L. Clark-Barkalow Effort: 493.4 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	215
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	13
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	5
93	*Ictalurus punctatus*	23

***Hybognathus amarus* by age class:**

age-0: 13
age-1:
age-2:

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-101**
Rio Grande, ca. 10 mi downstream of the San Marcial railroad bridge crossing

Site Number: 18 River Mile: 58.8 04 August 2014
UTM Easting: 307846 UTM Northing: 3716150 Zone: 13 Quad: Paraje Well
R.K. Dudley, A.L. Barkalow, and S.L. Clark-Barkalow Effort: 559.6 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	401
76	*Hybognathus amarus**	1
76	*Pimephales promelas*	1
76	*Pimephales vigilax*	1
76	*Platygobio gracilis*	1
93	*Ictalurus punctatus*	90
212	*Gambusia affinis*	1

***Hybognathus amarus* by age class:**

age-0: 1
age-1:
age-2: